CLOSURE/POST-CLOSURE PLAN

Circle "C" Landfill

Existing Cell

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ENVIRONMENTAL PROBLEM-SOLVING

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CIRCLE "C" LANDFILL

EXISTING LIMITED PURPOSE LANDFILL

CLOSURE/POST-CLOSURE PLAN

1. Closure Plan

1.1 Introduction

The plan outlined below is designed to allow Circle "C" Corporation to close its existing limited purpose landfill cell in a manner which minimizes the threat to human health and the environment from post-closure escape of solid waste constituents or decomposition products and prepares the facility for the post-closure period, as required by WAC 173-304-407(3), (4) and (5).

1.2 Sequence of Closure Activities

Circle "C" will continue to fill waste until final closure contours (see Sheet 3) are reached or until the calendar dates prescribed in the variance issued by the Southwest Washington Health District (SWHD). Actual height of fill will remain approximately three feet below final elevations to allow for the thickness of the top cap. As set forth in the variance, Circle "C" may continue to fill waste through October 31, 1990 if 80 percent of the disposal area

is closed as outlined in this closure plan. Circle "C" expects to begin closure activities between August 15 and September 1.

1.3 Closure Design and Construction

1.3.1 Top Cap

Upon completion of filling, waste will be regraded to achieve design slopes and final contours (see Sheet 3), and a multi-layered low permeability cap will be constructed over the waste (see Top Cap Detail, Sheet 5). An 12 inch layer of 1 inch crushed rock or approved equivalent with no fines will then be placed over the waste, serving as both a leveling course and a gas transmission layer. Next, a nonwoven geotextile filter fabric will be laid down to prevent transport of fines into the gas transmission rock. A 24 inch layer of soil will then be placed in 6 inch lifts and compacted to achieve a permeability of 1×10^{-6} cm/sec or less. On-site soils have been tested (see Appendix D) and are capable of being compacted to achieve the required permeability. Finally, a 6 inch layer of topsoil will be placed and seeded with a mixture of adapted grasses. The final grade of the surface slopes will be a minimum of 2 percent to prevent ponding, and the grade of side slopes will be a maximum of 33 percent to minimize erosion.

1.3.2 Alternate Cap Design for Waste-Over-Waste Closure

Circle "C" Corporation is currently seeking the necessary permits for a new landfill cell adjacent to the existing cell. One alternative currently being investigated is the construction of a new cell over the closed side slope of the old cell. The regulatory viability of this option has not yet been determined; however, such a scenario would in all likelihood require the use of a synthetic flexible membrane liner (FML) in the top cap of the old cell. If this option is approved and a synthetic liner specified, Circle "C" will submit a revised closure design incorporating a FML and appropriate ancillary components. All other aspects of closure will remain the same.

1.3.3 Gas Control System

A passive gas control system will be used to collect and flare methane produced by the decomposition of waste. The tight native clays and silts which form the sides of the landfill will force gases to migrate upward through the relatively porous waste material. Upon reaching the surface of the waste, upward progress will be impeded by the low permeability soil layer, and gas will move laterally through the 12 inch layer of gas transmission rock. The gas will be collected by perforated PVC pipes laid in trenches of gas rock set 12 inches into the surface of the waste (see details 1 and 7, Sheet 5). These trenches will be wrapped with an 8 ounce geotextile to maintain their integrity. These lateral pipes will connect to a central pipe along the crest of the landfill (see Sheet 3) and the collected gases will be

routed to a flare. The flare used will be a Fite brand Model FS VPE-F or equivalent. Since levels of methane may not always be sufficient to support combustion, the flare will be equipped with a continuously burning pilot supplied by a propane tank. Both the tank and the flare will be enclosed by a chain link fence and located in an area of native soil at the perimeter of the landfill, with the tank and controls protected by a roof. Landfill gas condensate will be collected by two solid PVC perimeter lines tying together the downhill ends of the gas laterals. The condensate collection lines will be routed to the leachate collection system.

1.3.3.1 Justification of Passive Gas System

An active gas system is not necessary for the Circle "C" landfill and may actually be less effective than the passive system proposed. Any gas generated within the landfill will exit via the path of least resistance -- in this case the porous gas collection blanket and the collection pipes. Gas generation will build up slight gas pressures, forcing the gas through the collection lines and to the flare compound where it will be burned by a continuous pilot flare.

If an active system were installed the only change in configuration would be the addition of a vacuum pump to pull gas from the landfill. If such a pump were installed at Circle "C", the slight permeability of the clay cap would cause gas levels to drop below combustible levels in a matter of weeks due to the vacuum-induced infiltration of outside air. An active

system could actually cause a backflashing hazard as methane levels drop into the 5-15 percent range and oxygen (in outside air) is introduced into the system.

1.3.4 Extension of Leachate Collection System

Leachate is currently collected by three 6 inch perforated pipes trenched into the landfill during the summer of 1989. These pipes drain to a manhole near the southeast corner of the existing fill (see Sheet 2). Leachate is pumped from the manhole to a 10,000 gallon storage tank and trucked off-site for disposal at the City of Vancouver's Westside Treatment Plant under a wastewater discharge permit. The proposed closure plan calls for filling the area between the northeast face of the landfill and the berm downcanyon of this face, in an area where woodwastes had previously been filled. If sufficient volumes are received to require filling of this area, the leachate collection system must be extended as shown in Sheet 2. A new manhole and pump station will be constructed at the base of the landfill to service the extended system. The existing storage tank will be moved and an all-weather access road and new truck loading dock constructed near the manhole.

The HELP model was run using the proposed landfill design to predict the volumes of leachate that must be handled. An explanation of the assumptions used in running the model, along with the data printouts, is contained in Appendix A. Assuming all leachate generated enters the collection system, the model predicts a peak daily flow of 1160 gallons. The storage tank can therefore store 8.6 days of this predicted peak flow. The manhole

itself will have a storage capacity of approximately 1700 gallons below the leachate pipe. A 20 gpm submersible electric pump will be used to move leachate from the manhole to the storage tank. The pump will be activated by the level of leachate in the manhole, and both the manhole and the tank will be equipped with high-level alarms.

1.3.5 Collection of Discharge From Underdrain

A network of perforated pipes was installed beneath the landfill prior to the original construction to drain a perched water table that exists in the vicinity of the site. This "underdrain" system is connected to a buried 24 inch culvert which runs down the canyon and daylights into a manhole just below the lower sediment pond (formerly a leachate collection pond). After the discharge from this system was analyzed and showed evidence of impact from the landfill (see February 1990 Monitoring Well Sample Analysis Results for Circle "C" Landfill), a pump was installed in the manhole and the fluid collected in a storage tank for off-site disposal as leachate.

The underdrain discharge is currently collected in a separate tank. The flow has been measured at approximately 1/2 gallon per minute during winter months and appears to be relatively constant. If a peak flow of 1 gpm is assumed for design purposes, the pumping and storage system must handle a peak daily flow of 1440 gallons. The existing pump is rated at 20 gpm and the storage tank holds 1000 gallons, providing less than a day's storage

at the assumed peak flow. This tank will be replaced this summer with a larger tank to provide sufficient storage.

1.3.6 Erosion Control

An erosion control plan was developed as a condition of the variance and submitted to the SWHD on April 30, 1990. This plan has been included as Appendix B; the engineering drawings are included with the full set of closure plan drawings as sheets S1-S5.

1.3.7 Quality Assurance/Quality Control

An independent engineering firm will provide third-party confirmation of quality assurance/quality control procedures used in the landfill's construction. This firm will be selected by SWHD via a request for proposals and will report directly to the district. The costs of this oversight will be borne by Circle "C".

1.4 Closure Cost Estimates, Financial Assurance and Fund Withdrawal Intervals

Closure cost estimates are presented in Table 1. Costs for erosion control, installation of gas monitoring wells and construction of additional leachate and underdrain collection facilities are considered to be operational costs of complying with the variance rather than

closure costs and are not included. Cost estimates are based on closure combustion being performed by Circle "C" Corporation.

Funds for closure have been placed in an approved trust account with Security Pacific Bank at the Portland headquarters office. These funds may only be released with the approval of SWHD.

Since closure will essentially occur all at once, a single withdrawal from the closure trust account is projected. Alternatively, 80 percent of the funds may be withdrawn at the beginning of closure activities to accomplish 80 percent closure by October 1 as specified in the variance, with the remaining 20 percent withdrawn as necessary to complete closure by December 1.

1.5 Closure Notification

Notification of intention to close was made in the closure plan submitted to SWHD on January 12, 1990. This notice serves to revise the original closure dates to comply with the variance issued by SWHD. As noted above, Circle "C" expects to begin closure in time to place final cover over 80 percent of the landfill by October 1, 1990. It is expected that closure activities will begin between August 15 and September 1. Closure activities will be completed by the dates specified in the variance.